

CTE Standards Unpacking Health Science Careers II

Course: Health Science Careers II

Course Description: Health Science Careers II will help a student discover and develop marketable and real world skills that are essential to all health care workers. This course will cover real world skills such as infection control, disease, diagnosis, treatment, hands on skills, and documentation.

Career Cluster: Health Science

Prerequisites: Health Science Careers I

Program of Study Application: Health Science Careers II is the second cluster course in the Health Science career cluster. Completion of Health Science Careers II prepares a student to participate in Medical Terminology and/or a pathway courses in any of the Health Science pathways: Biotech Research and Development, Therapeutic Services, Health Informatics, Diagnostics or Support Services.

INDICATOR #HS2 1: Identify and apply principles of infection control.		
SUB-INDICATOR 1.1 (Webb Level: 3 Strategic Thinking): Discuss the chain of infection.		
SUB-INDICATOR 1.2 (Webb Level: 2 Skill/Concept): Understand and apply the prevention of pathogen transmission.		
Knowledge (Factual): -Chain of infection and its components -Types of infections -Methods to break or stop the chain of infection -Development of resistant pathogens -Sterile technique -Healthcare acquired infections (nosocomial) -Signs and symptoms of infection	Understand (Conceptual): -The importance of preventing the development and spread of pathogens -The implications of improper aseptic techniques in a variety of healthcare settings -The importance of maintaining aseptic conditions for compromised patients/residents	Do (Application): -Return demonstrations (e.g. handwashing, application and use of PPE, setting up a sterile field) -Patient isolation scenarios -Environmental microbe culture labs

Benchmarks:

Students will be assessed on their ability to:

- Differentiate between contaminated, aseptic, and sterile
- Determine cause and effect of each component of the chain of infection.
- HOSA competitive events, CNA certification
- Identify several potential reservoirs of infection (e.g. patients, caregivers, healthcare workers, equipment).

Academic Connections

ELA Literacy and/or Math Standard (if applicable, Science and/or Social Studies Standard):

Science and Engineering Practice (SEP) – Designing and carrying out scientific Investigations

HS-LS2-6: Evaluate the claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms under stable conditions; however, moderate to extreme fluctuations in conditions may result in new ecosystems.

W.1 Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.

Sample Performance Task Aligned to the Academic Standard(s):

-Collecting and describing the diversity of microorganisms from their environment while following aseptic techniques.

-Cite evidence to support the claim that misuse of antibiotics has led to the development of resistant bacterial strains such as MRSA (Methicillin Resistant Staphylococcus Aureus). Include how healthcare systems may contribute to this development if safety protocols are not followed.

-Explain each part of the infection chain and methods/procedures to stop the chain at that point.

INDICATOR #HS2 2: Discuss disease, diagnosis, and treatment.

SUB-INDICATOR 2.1 (Webb Level: 3 Strategic Thinking): Discuss disease concept with reference to Centers for Disease Control and National Institute of Health.

SUB-INDICATOR 2.2 (Webb Level: 3 Strategic Thinking): Evaluate and assess patient/residents' health.

SUB-INDICATOR 2.3 (Webb Level: 1 Recall): Recognize current treatment modalities including but not limited to obesity, heart disease, cancer, and respiratory.

Knowledge (Factual): -Epidemic -Sterile technique -Definition of disease per CDC and NIH -Superbugs -Accepted ranges of vital signs in a variety of age groups -Communicable/reportable diseases -Symptoms - common of diseases	Understand (Conceptual): -Changes in vitals signs may be an indicator of the presence of disease process and possible loss of homeostasis -Disease is usually a set of criteria and not just one symptom/sign -Disease may impact multiple systems	Do (Application): -Research CDC and NIH for a pandemic/epidemic disease (e.g. Zika, Ebola, HIV, mumps) -Examine health risk trends -Role playing—practical lab experiences
Benchmarks: <i>Students will be assessed on their ability to:</i> <ul style="list-style-type: none"> • Explain reasoning for changes in vital signs. • HOSA competitive events • CNA (Certified Nurse Aide) certification • Students will calculate their own BMI (basal metabolic index) • Identify common signs and symptoms and treatment of a disease 		
Academic Connections		
ELA Literacy and/or Math Standard (if applicable, Science and/or Social Studies Standard): HS-LS3-3 Apply concepts of statistics and probability to explain the variation and distribution of expressed traits in a population. (math) HS-LS-3: Plan and carry out an investigation to provide evidence that feedback mechanisms maintain homeostasis. (science)	Sample Performance Task Aligned to the Academic Standard(s): -Students will look at obesity and diabetes data/graphs then discuss causations including both genetic and environmental factors (e.g. prevalence of diabetes within certain populations and/or families). -Students will plan and carry out an investigation to determine the effect of changing body position on heart rate and blood pressure.	

<p>HSS-ID.A.3: Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).</p> <p>SL.4 Present information, findings, and supporting evidence clearly, concisely, and logically such that listeners can follow the line of reasoning and the organization, development, substance, and style are appropriate to purpose, audience, and task.</p>	<p>-Students will look at morbidity and mortality data to describe trends as well as possible causes. (CDC Disease Statistics)</p> <p>-Role play a lab experience citing the proper methods and materials to use and reasoning for each.</p>
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INDICATOR #HS2 3: Demonstrate hands-on patient/residents' care skills.		
SUB-INDICATOR 3.1 (Webb Level: 3 Strategic Thinking): Apply procedures for monitoring, measuring, and recording vital signs.		
SUB-INDICATOR 3.2 (Webb Level: 4 Extended Thinking): Apply First Aid/Cardiopulmonary Resuscitation (CPR), and Automated External Defibrillator (AED).		
SUB-INDICATOR 3.3 (Webb Level: 4 Extended Thinking): Demonstrate knowledge of direct patient/residents' care skills.		
<p>Knowledge (Factual):</p> <ul style="list-style-type: none"> -Blood pressure -Heart rate -Respiratory rate -Oxygen saturation -Temperature -Pain level (5th vital sign) -Electronic Medical Record -CPR -AED -Activities of daily living 	<p>Understand (Conceptual):</p> <ul style="list-style-type: none"> -The importance of appropriate first responder techniques during medical emergencies -Why accurate standard procedures are necessary when evaluating patients/residents -How direct patient care skills can directly affect the patient/resident and their outcome 	<p>Do (Application):</p> <ul style="list-style-type: none"> -Practice and demonstrate taking vital signs, CPR, and use of AED -Patient care scenarios -Case studies -Student internships/shadow experiences -SIM lab experiences

<p>(ADL's)</p> <p>-Reportable observations</p> <p>-Triage</p>		
<p>Benchmarks: <i>Students will be assessed on their ability to:</i></p> <ul style="list-style-type: none"> • CPR certification, Certified Nurse Aide (CNA), American Red Cross First Aid certification • Perform accurate vital signs, height and weight • Given a patient/resident, provide basic patient care skills such as making an occupied or unoccupied patient care bed. • Using role play, show proper caregiver skills in communication and care under a variety of situations (e.g. feeding, argumentative patient, pediatric). 		
<p><i>Academic Connections</i></p>		
<p>ELA Literacy and/or Math Standard (if applicable, Science and/or Social Studies Standard):</p> <p>HS-LS-2: Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.</p> <p>HSN-Q.A.1: Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.</p> <p>RI.1 Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.</p>	<p>Sample Performance Task Aligned to the Academic Standard(s):</p> <p>-Students will take vital signs and use them to evaluate proper function of the system involved and its interacting organs (e.g. blood pressure and the cardiovascular system – heart, lungs, vessels, blood).</p> <p>-Students will take height and weight vitals and convert them to metric units.</p> <p>-Read patient care scenarios for further understanding the role of communication in patient/resident treatment.</p>	

INDICATOR #HS2 4: Explain documentation standards and findings.		
SUB-INDICATOR 4.1 (Webb Level: 3 Strategic Thinking): Demonstrate use of technological documentation standards by entering data on the electronic medical record or paper.		
SUB-INDICATOR 4.2 (Webb Level: 3 Strategic Thinking): Differentiate between subjective and objective healthcare data to communicate patient/residents' status.		
Knowledge (Factual): -EMR -HIPAA -Subjective and objective healthcare data -Reportable observations -Legal document	Understand (Conceptual): -Documentation is a legal and ethical obligation. -Importance of reporting abnormal observations to a clinical supervisor -The medical record is a legal document is submissible in court	Do (Application): -Utilize and apply medical terminology -Perform practice charting -Review case scenarios and documentation
Benchmarks: <i>Students will be assessed on their ability to:</i> <ul style="list-style-type: none"> • Compare and contrast subjective versus objective data • Given a set of patient observations, correctly submit data into either electronic or paper forms • Review sample charts as part of scenarios to evaluate patient status as well as improper documentation(s) 		
Academic Connections		
ELA Literacy and/or Math Standard (if applicable, Science and/or Social Studies Standard): HSN-Q.A.3: Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.	Sample Performance Task Aligned to the Academic Standard(s): -Students will evaluate a set of vitals taken over a course of time to evaluate a patient's health. They need to be able to discuss that there are natural variations. There also needs to be a discussion of the documentation process with regards to accuracy and reporting procedures.	

RI.4 Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze how an author uses and refines the meaning of a key term or terms over the course of a text	-Utilize and apply proper medical terminology related to health care.
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INDICATOR #HS2 5: Utilize medical mathematics skills needed in healthcare work		
SUB-INDICATOR 5.1 (Webb Level: 2 Skill/Concept): Apply mathematical computations related to healthcare procedures		
SUB-INDICATOR 5.2 (Webb Level: 3 Strategic Thinking): Analyze diagrams, charts, graphs and tables to interpret healthcare data		
Knowledge (Factual): -Kilograms -Conversions -Common household measurements -Ratios -Percentages -Fahrenheit and Celsius -Milligrams -Milliliters/cubic centimeter -Military time -Intake and output (I&O)	Understand (Conceptual): -How to convert standard to metric measurements -Errors in measurement can have disastrous outcomes -The importance of accurate medication dosages and patient outcomes -Why military time is used in the healthcare field -Fluid intake and output is an indicator of patient/resident homeostasis	Do (Application): -Read examples (current events) of medication errors -Calculate medication dosages, fluid volumes -Compare a variety of measurement devices used in healthcare

Benchmarks:

Students will be assessed on their ability to:

- Convert own weight from pounds to kilograms
- Convert a 12 hour clock to a 24 hour clock and calculate current military time
- Given a medicine, calculate the dosage and medication timetable using students' own parameters (height and weight)
- Given a care provider's order and standard medication, determine the volume of medicine to be administered
- Draw up the appropriate dosage in a syringe according to provider's orders
- Calculate a "patient/resident" I&O for 24 hours

Academic Connections

ELA Literacy and/or Math Standard (if applicable, Science and/or Social Studies Standard):

HSN-Q.A.1: Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.

HS-LS1-3: Plan and carry out an investigation to provide evidence that feedback mechanisms maintain homeostasis.

RI.7 Integrate and evaluate multiple sources of information presented in different media or formats (e.g., visually, quantitatively) as well as in words in order to address a question or solve a problem

Sample Performance Task Aligned to the Academic Standard(s):

-Students will convert standard measurements into metric measurements (e.g. Fahrenheit to Celsius, ounces to milliliters/cubic centimeters).

-Utilize data from patient input and output of fluids to determine circulatory and renal status.

-Read a care provider's order and standard medication information to determine the volume of medicine to be administered as well as assess the possible side effects and interactions.

Additional Resources

- SDMyLife www.sdmylife.com
- Health Occupations for Today and Tomorrow <http://healthcareers.sd.gov/>
- American Nurses Association <http://www.nursingworld.org/>
- American Medical Association <https://www.ama-assn.org/>

- American Red Cross – First Aid, CPR, AED information and quizzes
<http://www.redcrossrefresher.com/firstaid/>
- US Dept of Health and Human Services – Health Information Privacy:
<https://www.hhs.gov/hipaa/index.html>
- OBRA – USLegal <https://definitions.uslegal.com/f/federal-nursing-home-reform-act-obra-87/>
- OSHA <https://www.osha.gov/>
- SDHCA: CNA Certification Information <http://www.sdhca.org/>
- Resident's Bill of Rights: AARP <http://www.nursinghomealert.com/residents-bill-of-rights>
- CDC Disease Statistics: <https://www.cdc.gov/datastatistics/index.html>)
- American Heart Association: First Aid, BLS/CPR, AED Information for Health Care Providers <http://www.heart.org>
- HOSA Medical Math Event/HOSA Medical Math Conversion Chart
<http://www.hosa.org/sites/default/files/MM16FINAL.pdf>
- NIH <https://www.nih.gov/>